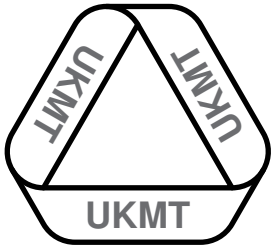


A1

TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

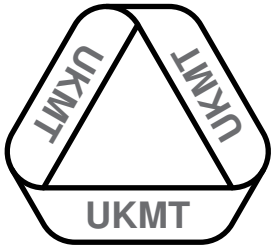
Place the numbers A, B and C in decreasing order of size.

$A = \frac{7}{8}$

$B = 0.86$

$C = 87\ \%$

ANSWER:



TEAM MATHS CHALLENGE 2016

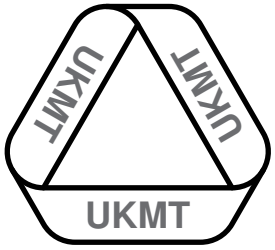
NATIONAL FINAL

RELAY

A2

What is the **next** year with digits having the same median and range as the digits of this year, 2016?

ANSWER:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

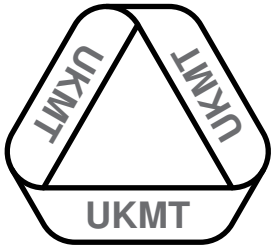
RELAY

A3

A wheel makes 840 revolutions in one hour.

How long does it take in minutes, at the same rate, to complete 28 revolutions?

ANSWER: minutes



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

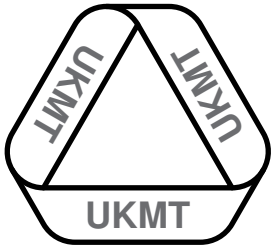
A4

Fifty people were stopped in the street and asked if they watched TV or listened to the radio that day.

Eight said they did neither, forty-one watched TV and six listened to the radio.

How many watched TV and also listened to the radio?

ANSWER:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

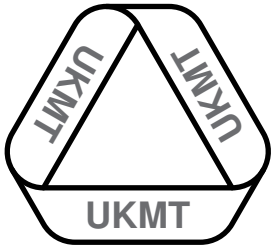
RELAY

A5

A large tin has 100 sweets in it. The first person in a long queue takes 1, the second 2, the third 3, with each person taking one more sweet than the person before them.

How many sweets are left when the next person cannot take their number of sweets?

ANSWER: sweets



Team Maths Challenge 2016

National Final

Relay

A6

The sign in a railway carriage lists the stops: Havant, Cosham, Portchester, Fareham, Swanwick and Southampton.

What is the median number of letters in the station names?

Answer:

A7

a, b, c, and d represent the numbers 2, 3, 4 and 5, but not necessarily in that order.

What is the smallest fraction with numerator $(a + d)$ and denominator $(b + c)$?

ANSWER:

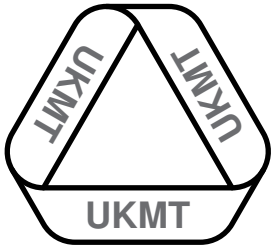
A8

The fair offers a special ticket of £12 for an evening pass allowing unlimited rides. Alternatively each ride will cost £1 per person.

Four friends, Bert, Carol, Del and Eve each buy the special ticket. Carol and Eve go on 18 rides each and Bert and Del go on 9 and 14 respectively.

Altogether how much did they save by buying the special tickets?

ANSWER: £



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

A9

The points A (2,1), B (5,3), C (3,6) and D form a square.

The square is reflected in the line $x = 4$.

What are the coordinates of the image of point D?

ANSWER:

A10

A hiker practising compass work walks a distance of 24 metres on a bearing of 050° then 32 metres on a bearing of 140°.

Finally she returns in a straight line to her starting point.

What **total** distance has she walked?

ANSWER: _____ metres

TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

The trapezium $PQRS$ is plotted on a graph.

PQ is parallel to SR.

The trapezium has one line of symmetry,

$P = (0,0)$

$Q = (3,0)$

$R = (5,5)$

What is the area of the trapezium?

ANSWER: square units

A12

An official document needed the date written in the form dd/mm/yyyy.

On the 26 January this year I noticed that 4 digits were each used twice.

How many days later is the **last date** for which this happens again this year?

ANSWER: _____ days

A13

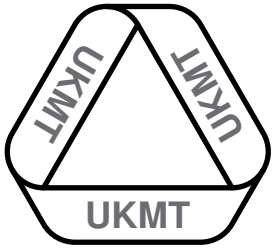
Ann buys wool in a shop which charges her £6 for 10 balls. Sue gets her wool in a shop where £7.80 is the cost of 12 balls.

They use the same number of balls of wool to knit identical jumpers.

One of them spent 20p less than the other on the wool that she used.

How many balls of wool did they use between them?

ANSWER:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

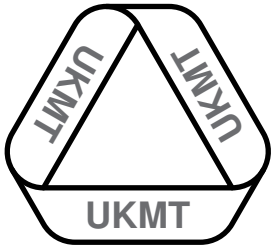
RELAY

A14

A tap is dripping constantly at 12 ml per 30 seconds. This continues until detected three hours later and stopped.

How much water was wasted in the three hours?

ANSWER: litres



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

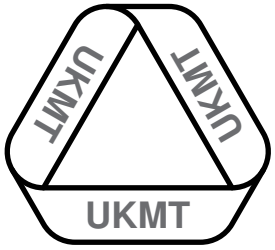
RELAY

A15

A book containing 390 puzzles is printed with two puzzles on each page. It took Nick 17 minutes, on average, to complete one page.

How long, in hours and minutes, did it take Nick to complete the puzzle book?

ANSWER:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

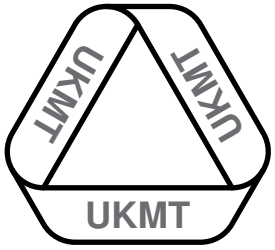
RELAY

B1

A rectangle with length 20 cm and width 16 cm has the same perimeter as a square.

What is the area of the square?

ANSWER: _____ cm^2



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

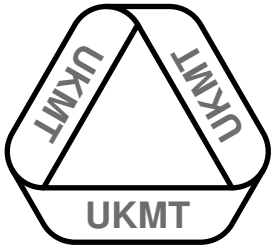
B2

A big box contains 100 sweets.

The first person takes one sweet, the next two, and so on, each taking twice as many as the one before.

How many sweets are left when the next person cannot take her full share?

ANSWER: sweets



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

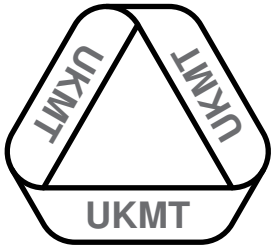
RELAY

B3

a, b, c, and d represent the numbers 2, 3, 4 and 5, but not necessarily in that order.

What is the largest fraction with numerator $(a + b)$ and denominator $(c + d)$?

ANSWER:



Team Maths Challenge 2016

National Final

Relay

B4

On the first day of each month Joshua receives £7.60 pocket money. On his birthday, on 29 February, he is given a 5% increase.

How much will he receive this year in pocket money?

Answer:

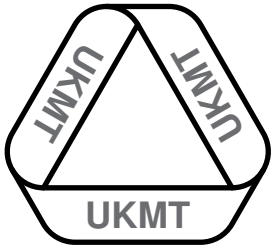
B5

An office joker arranges for the office clock to run backwards from midnight on 31 March.

What time does the clock show when the manager enters the office at 08.37 on April Fool's Day (1 April)?

Use a 24-hour clock.

ANSWER:



Team Maths Challenge 2016

National Final

Relay

B6

Thirty-five students were asked to sign up for at least one of the three sports at the club. 24 signed up for squash and 16 for badminton. All the badminton players also signed up for squash. One squash player signed up for table tennis. None of the students signed up for all three.

How many students signed up for table tennis?

Answer:

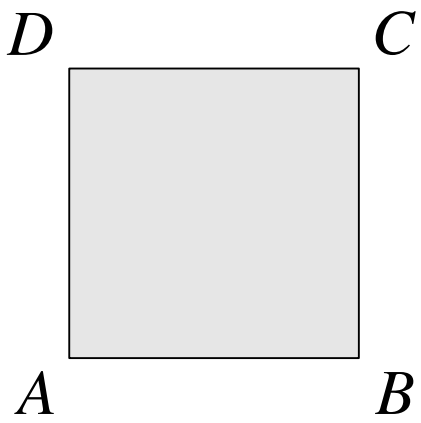
TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

A square $ABCD$ of side 3 cm is rotated 90° clockwise about the point A, then 90° clockwise about the point C, then 90° clockwise about the point B, and finally 90° clockwise about the point D.

How far is the vertex A from its original position?



ANSWER: _____ cm

Team Maths Challenge 2016

National Final

Relay

The trapezium $ABCD$ has area $16\,\text{cm}^2$.

AB is parallel to DC.

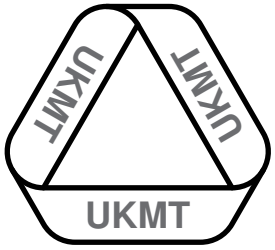
$A = (1, 1)$

$B = (3, 1)$

$C = (6, 5)$

What are the coordinates of D?

Answer:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

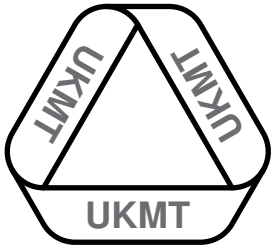
RELAY

B9

A passenger pays for his £3.72 bus ticket and receives some change from the driver. No paper money is used by either.

What is the smallest possible number of coins used in the transaction?

ANSWER:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

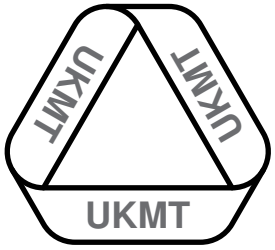
RELAY

B10

When 63 is divided by a positive integer x the remainder is 3.

What is the total of all the possible values of x?

ANSWER:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

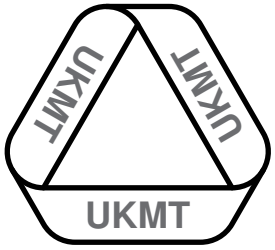
RELAY

B11

A new ride at the fair is a roundabout in the shape of a pentagon, with identical seats at the vertices.

In how many different ways can five friends sit around the roundabout?

ANSWER:



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

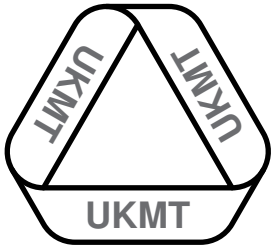
RELAY

B12

The swimming teacher has four sessions on Monday with between 6 and 9 students per session. She charges £18 per person for each session.

What is the difference between the least and the most she would receive for 10 Mondays?

ANSWER: £



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

B13

The sign in a railway carriage lists the stops: Barnham, Chichester, Bosham, Southbourne, Emsworth and Havant.

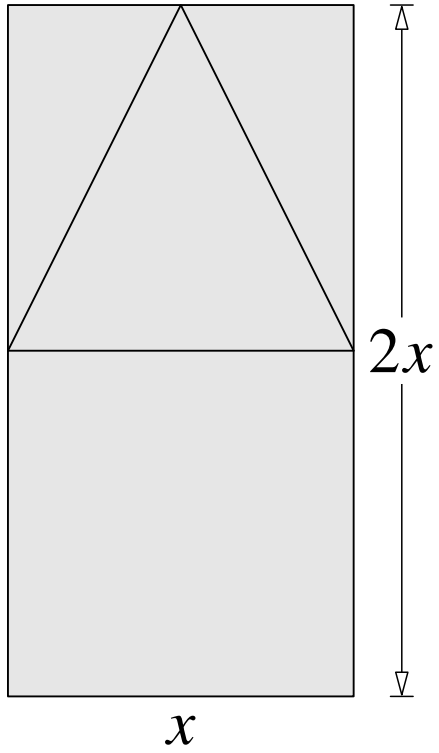
What is the median number of letters in the station names?

ANSWER:

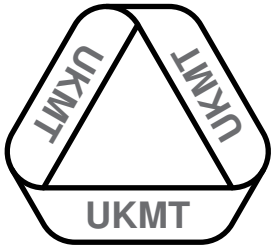
B14

Kenneth began drawing a net of a square based pyramid. He got as far as drawing a rectangle x by $2x$ and dividing it into two identical squares, one of which is the base of the pyramid. One triangular face was drawn by joining the midpoint of the shorter side of the rectangle to the vertices of the base of the pyramid. The other equal triangular faces were then drawn.

What is the area of the complete net?



ANSWER: _____ square units



TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

RELAY

B15

Sara is practising her compass-work before an expedition in the New Forest.

She walks 84 paces on a bearing of 041°.

She then walks 35 paces on a bearing of 311°.

Finally, she walks 50 paces directly towards her starting point.

How many paces is she away from her starting point?

ANSWER: paces